

5-3 Indirect Proof

Indirect Proof

1. Assume conclusion is false
2. Reason until you contradict the given
3. State assumption is false

Example 1

Given: Mary received an A on the test.

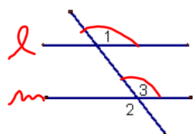
Prove: Her grade was $\geq 90\%$.

- ① Assume Mary's grade $< 90\%$.
- ② If her grade < 90 , then she did not earn an A (school policy)
* Contradiction of Given.
- ③ Our assumption is false
 \therefore Mary $\geq 90\%$

Example 2

Given: $\angle 1 \cong \angle 2$

Prove: $\angle 1 \cong \angle 3$

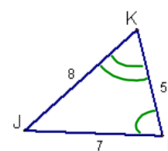


- ① Assume $\angle 1 \cong \angle 3$
- ② {
 - ⓐ Then $l \parallel m$ b/c of corr \angle s \cong then lines are \parallel .
 - ⓑ And if $l \parallel m$, then $\angle 1 \cong \angle 2$ b/c of \parallel , alt ext \angle s \cong .
 - ⓒ * Contradiction of given
- ③ Our assumption is false.
 $\therefore \angle 1 \not\cong \angle 3$

Example 3

Given: picture

Prove: $m\angle K < m\angle L$



- ① Assume $m\angle K \geq m\angle L$
- ② ^{Then} $JK = JL$ (conv. I Δ thm)
* of picture
then $JL > JK$ (thm 5.10)
* Contradiction of picture
- ③ Our assumption is false.
 $\therefore m\angle K < m\angle L$

Example 4

Given: $\frac{1}{2y+4} = 20$

Prove: $y \neq -2$

① Assume $y = -2$

② $\frac{1}{2(-2)+4} = 20$
 $\frac{1}{0} = 20$ or

* Contradiction of given

③ Our assumption is false
 $\therefore y \neq -2$

Homework

p. 258 #s 13-17, 19, 21, 22

not 15